



National Transportation Safety Board Aviation Accident Data Summary

Location:	Smith, NV	Accident Number:	LAX06FA277A
Date & Time:	08/28/2006, 1506 PDT	Registration:	N879QS
Aircraft:	Raytheon Hawker 800XP	Injuries:	2 Minor, 3 None
Flight Conducted Under:	Part 91 Subpart K: Fractional		

Analysis

The Hawker and the glider collided in flight at an altitude of about 16,000 feet above mean sea level about 42 nautical miles south-southeast of the Reno/Tahoe International Airport (RNO), Reno, Nevada, which was the Hawker's destination. The collision occurred in visual meteorological conditions in an area that is frequently traversed by air carrier and other turbojet airplanes inbound to RNO and that is also popular for glider operations because of the thermal and mountain wave gliding opportunities there.

Before the collision, the Hawker had been descending toward RNO on a stable northwest heading for several miles, and the glider was in a 30-degree, left-banked, spiraling climb. According to statements from the Hawker's captain and the glider pilot, they each saw the other aircraft only about 1 second or less before the collision and were unable to maneuver to avoid the collision in time. Damage sustained by the Hawker disabled one engine and other systems; however, the flight crew was able to land the airplane. The damaged glider was uncontrollable, and the glider pilot bailed out and parachuted to the ground.

Because of the lack of radar data for the glider's flight, it was not possible to determine at which points each aircraft may have been within the other's available field of view. Although Federal Aviation Regulations (FARs) require all pilots to maintain vigilance to see and avoid other aircraft (this includes pilots of flights operated under instrument flight rules, when visibility permits), a number of factors that can diminish the effectiveness of the see-and-avoid principle were evident in this accident. For example, the high closure rate of the Hawker as it approached the glider would have given the glider pilot only limited time to see and avoid the jet. Likewise, the closure rate would have limited the time that the Hawker crew had to detect the glider, and the slim design of the glider would have made it difficult for the Hawker crew to see it. Although the demands of cockpit tasks, such as preparing for an approach, have been shown to adversely affect scan vigilance, both the Hawker captain, who was the flying pilot, and the first officer reported that they were looking out the window before the collision. However, the captain saw the glider only a moment before it filled the windshield, and the first officer never saw it at all.

Although the Hawker was equipped with a traffic alert and collision avoidance system (TCAS)-II capable of generating vertical resolution (collision avoidance) advisories (RA), the glider's Mode C transponder was turned off (and, therefore, not detectable by the Hawker's equipment) because the glider pilot wanted to reserve battery power for radio use. Although transponder installation is not required on gliders, FARs require that any person operating a transponder-equipped aircraft must use the transponder. Had the glider pilot turned on his transponder, the Hawker's TCAS-II likely would have depicted the glider on the flight crew's monitor and would have generated an RA to alert the crewmembers and prompt them to deviate their course in time to prevent the accident. According to Reno Terminal Radar Approach Control (TRACON) personnel, it is not uncommon for arriving and departing air traffic to receive TCAS RAs because of transponder-equipped gliders operating in the area. In a 30-day interval before the accident, the facility recorded four such TCAS RA events reported by pilots. Each event involved a conflict with transport-category airplane operated under 14 CFR Part

121 and a glider.

In addition to the TCAS benefits, the accident glider's Mode C transponder, if turned on, would have provided position and altitude information to air traffic control (ATC) personnel who could have used that information to provide separation services and traffic advisories to the Hawker crew. Reno TRACON personnel reported that, although they can sometimes see primary radar returns for what they suspect are nontransponder-equipped gliders, they did not see any primary returns from the accident glider before this collision. Further, even when ATC personnel detect primary returns, they cannot ascertain the type or altitude of the aircraft. Review of the Aviation Safety Reporting System (ASRS) database revealed that, since 1988, there have been more reports of near midair collisions (NMACs) involving air carrier/corporate jet traffic and gliders in the vicinity of RNO than any other airport area. Because ASRS reports are voluntary, it is possible that other NMAC events occurred but were unreported.

The Federal Aviation Administration (FAA) has long been aware of the potential for a collision involving a glider and air carrier traffic in the vicinity of RNO. More than 10 years before this accident, Reno Flight Standards District Office (FSDO) personnel concluded that, on the basis of many NMAC reports, FAA inspectors' observations of traffic conflicts, and other information, the increasing glider operations in the departure and arrival areas around RNO represented an "extremely dangerous situation," especially because many gliders were not equipped with transponders, were difficult for air carrier flight crews to see, and were flown by pilots who were not communicating with ATC. On April 11, 1997, the Reno FSDO manager submitted a memorandum to the FAA's Office of Accident Investigation, Recommendation and Analysis Division that detailed these concerns and suggested a number of solutions, including mandatory transponder installation in gliders. In response to the concerns, the FAA published a notice to airmen cautioning pilots about glider soaring operations 30 to 50 miles south of RNO and took action that resulted in revisions to the San Francisco Sectional Aeronautical Chart and five of the RNO-published instrument procedures to include caution boxes to warn pilots of extensive glider activity. However, the FAA elected not to implement the transponder recommendation.

Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the glider pilot to utilize his transponder and the high closure rate of the two aircraft, which limited each pilot's opportunity to see and avoid the other aircraft.

Findings

Occurrence #1: MIDAIR COLLISION

Phase of Operation: DESCENT - NORMAL

Findings

1. (C) TRANSPONDER - NOT USED - PILOT OF OTHER AIRCRAFT

Pilot Information

Certificate:	Airline Transport; Commercial	Age:	38
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane
Flight Time:	6134 hours (Total, all aircraft), 1564 hours (Total, this make and model)		

Co-Pilot Information

Certificate:	Airline Transport; Commercial	Age:	35
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane
Flight Time:	3848 hours (Total, all aircraft), 548 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Raytheon	Registration:	N879QS
Model/Series:	Hawker 800XP	Engines:	2 Turbo Fan
Operator:	NetJets Aviation, Inc. (as Program Manager)	Engine Manufacturer:	Garrett
Operating Certificate(s) Held:	On-demand Air Taxi (135)	Engine Model/Series:	TFE 731
Flight Conducted Under:	Part 91 Subpart K: Fractional		

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	RNO, 4415 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None	Wind Speed/Gusts, Direction:	11 knots / 17 knots, 280°
Temperature:	34° C	Visibility	20 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Carlsbad, CA (CRQ)	Destination:	Reno, NV (RNO)

Wreckage and Impact Information

Crew Injuries:	2 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	3 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	38.844722, -119.497222		

Administrative Information

Investigator In Charge (IIC): Nicole L Charnon

Adopted Date: 03/20/2008

Investigation Docket: NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

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